

This test covers chapter four of *College Algebra* by Sullivan and Sullivan. No credit will be given for problems that I can not find or read! Relax and read each question carefully. Unless otherwise indicated, each part of each problem is worth four points.

1. Let $f(x) = (x-2)^3(x+1)$.

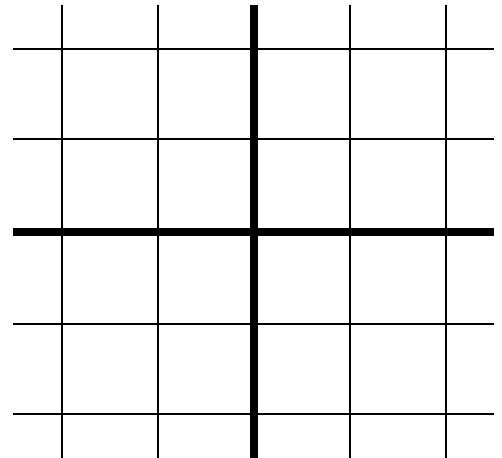
a. Find the y intercept(s). (2 points)

b. Find all of the x intercept(s) and state if they have even or odd **multiplicity**.

c. What **power function** does $f(x)$ resemble for large values of x ? (2 points)

d. Determine the **local minima**, if any, correct to 2 decimal places.

e. Draw the graph on the right **and label** intercepts and minima.



2. Let $y = 2x^2 + 6x + 1$.

a. What is the vertex of this graph?

b. What is the axis of symmetry (2 points)

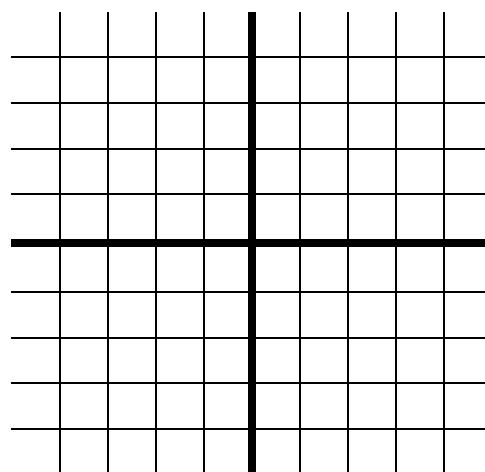
3. Let $f(x) = \frac{x^3 - x^2}{x^2 - 9}$.

a. What is the domain of $f(x)$?

(2 points)

b. Find the vertical asymptotes, if any, of $f(x)$.

c. Find the horizontal and/or oblique asymptotes, if any, of $f(x)$.



d. Find the x -intercepts, if any, of $f(x)$.

e. Draw the graph of $f(x)$ on the right and label the asymptotes, intercepts.

4. Write the following in the standard form $a + bi$

a. $\frac{3 - 2i}{1 + i}$

b. $(2 - i)^3$

c. $\sqrt{-16}$

5. Let $f(x) = 3x^4 + 5x^3 - 7x^2 - 15x - 6$.

a. Use Descartes Rule of Signs to determine how many positive zeros $f(x)$ might have.

b. Use Descartes Rule of Signs to determine how many negative zeros $f(x)$ might have.

c. What are (all of) the potential rational zeros of $f(x)$?

d. Find the rational zeros of $f(x)$.

d. List any irrational zeros correct to two decimal places.

6. Use your calculator to fit a general power function through the points on the left. You just need to state the equation (you do not need to draw a scatter plot).

x	y
7	2
29	3
65	4
1	1

7. $2i$ is a zero of $x^3 - 4x^2 + 4x - 16$. Find the remaining two zeros.

(6 points)

8. The graph at the right shows a function with one positive zero. Is this zero of even or odd multiplicity?

